DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

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ECE Distinguished Lecture Series

Dmitri Maslov

Program Director
The National Science Foundation
Division of Computing and Communication Foundations
Directorate for Computer & Information Science & Engineering

Quantum Computing: Why? What? When?

Thursday, October 11, 2018, 11:30 am – 12:30 pm

Location: SEH B1220

Abstract

My talk will consist of three parts, each designed to answer, to the extent possible, the following questions:

1. Why should quantum computing be of interest? I will base the discussion on a combination of complexity-theoretic/algorithmic and physical-level arguments, as well as potential impact. Indeed, quantum computers carry the ability to solve instances of scientific and practical (defined as those carrying economic value) problems the answer to which does not appear to be feasible to obtain with classical computers.

2. What is quantum computing? This is the most technical part of the talk. I will define the basic concepts of quantum computing (data structure, circuits, measurement), and illustrate the advantage offered by a quantum algorithm with a small example. No advanced or specialized knowledge beyond that of linear algebra will be necessary.

3. When are we going to have quantum computers? I will summarize the state of the art in existing quantum information processing technologies, and attempt to extrapolate into the future. This is the most speculative part of the talk.

Biography

Dr. Dmitri Maslov is a Program Director in the Division of Computing and Communication Foundations, Directorate for Computer & Information Science & Engineering, National Science Foundation, Arlington, VA (since 2008). He directed various programs, including Quantum Computing, Algorithms, Computational Geometry, Complexity, Nanocomputing, and Symbolic and Numeric Computing with cumulative yearly spending of about $15M. During the period of May 2015 to November 2016 Dmitri was on sabbatical with the University of Maryland. His research interests include quantum circuits and architectures, quantum compiling, quantum information processing, and reversible logic; the overarching goal uniting these research areas is the establishment of the knowledge base and the development of a set of tools for efficient control and utilization of quantum information processing systems.